Browning of Evergreens

FarmFacts

Produced by Saskatchewan Agriculture and Food and Saskatchewan Rural Development

Browning of evergreens is a common complaint every year in Saskatchewan. Needles of spruce, pine, cedar or juniper turn brown and eventually drop from the tree.

There are numerous possible causes of needle browning, and it can be difficult to pinpoint the exact cause. Often several adverse factors are working in combination. Background information about the tree's history (eg. approximate age or planting date, watering practices, or exposure to herbicides) are essential to a good diagnosis.

The pattern of needle browning is also important. Browning of the older, inner needles is less serious than damage occurring at the tips of the branches.

Natural Autumn Needleshed

Spruce trees generally retain their needles for 5 to 8 years, while pines keep theirs for only 3 to 5 years. Shedding of older, inner needles is a normal seasonal occurrence, usually taking place in the autumn. However, anything that puts a stress on the tree can accelerate needle loss (eg. drought, insect damage). Needle loss tends to be more noticeable on pine than on spruce, as pines retain their needles for a shorter period. When needles are lost they will not be replaced, however new spring growth at the branch tips should make the loss less noticeable.

Winter Browning or Desiccation

Winter desiccation is one of the most common causes of needle browning in evergreens. The needles turn yellow then brown from the tips down, and the tree appears scorched. Damage occurs on warm winter or early spring days as the needles begin to respire and loose moisture. The moisture can not be replaced by the roots which remain dormant in the frozen soil. Older needles are sacrificed to provide needed moisture to newer growth. Trees in exposed locations are more likely to suffer from winter browning. Young trees are much more susceptible than mature trees, and some strains or varieties of trees are more resistant than others.

Similarly, localized heating from sunlight reflected off snow in the winter can cause browning, usually on the south or west sides of a tree.

Other types of winter injury include alternate freezing and thawing of soil, which may result in damage or death to tree roots. Heavy coatings of ice and snow can cause mechanical injuries to branches. Spring frost damage may cause new growing tips to droop, turn brown and die.

Control of winter browning:

It is not always possible to completely prevent winter browning but steps can be taken to reduce the damage:

1. Keep trees well watered during the summer.
2. The usual recommendation is to stop watering in late summer to allow trees to harden off for the winter. However, there is evidence that moderate watering at this time may be beneficial if the tree is under drought stress.
3. Water deeply just before freeze-up to provide a reserve of water for the winter.
4. Water again in early spring.
5. Wrap small trees in burlap in late fall.
6. Plant species adapted to Saskatchewan conditions.

Drought Damage

Drought damage appears similar to winter desiccation, but injury usually follows periods of very hot, dry, windy weather during the summer. Severe and repeated water shortages could cause the eventual death of a tree.

Salt Damage

High salt levels in the soil can injure or kill trees. Often soil is naturally saline, or the condition may be aggravated by application of road salt or saline water.

Salt damage may cause needles to turn yellow at the tips where the salt concentration builds up first. Later the needles turn reddish brown or reddish purple. Usually the entire tree will be affected. Needle browning may resemble drought damage or winter browning. Sometimes one side of a tree facing a busy road may be browned by splashing slush containing road salt.

Control:

If trees are already severely damaged it may be too late to save them. In the early stages, flushing out the soil with water will help to lower salt levels in the soil. It is best not to plant evergreens in soils with high salt concentrations. Some tree species are more salt tolerant than others.

Herbicide Damage

Improper use of herbicides or soil sterilants often cause injury to trees. Discoloration, twisting and distortion

may be caused by drift of phenoxy-type herbicides such as 2,4-D or dicamba. Soil sterilants used to control vegetation can persist in the soil for years to be taken up by trees near the treated area. Symptoms include yellowing or browning at the branch tips to total dieback of an entire tree. Some chemicals may cause new growth to turn white. Damage is sometimes confined to only the side of the tree that was in contact with the chemical.

Control:

Prevention is the only adequate means of control. Soil sterilant chemicals should not be used in urban situations.

Apply lawn herbicides on a calm day according to label directions. Do not use a sprayer contaminated with herbicide residues for other purposes such as insecticide application to trees.

Spider Mite Damage

Spruce spider mites are common pests which can cause a general browning of spruce, juniper or cedar. Initial damage may be more evident on the inner portions of the tree. Damage is caused by mites sucking plant sap. Foliage becomes mottled looking, looses colour and eventually browns and drops. The mites also spin fine, silken webbing on the needles. Repeated and severe infestations could kill a tree.

The mites overwinter as eggs at the base of needles or under bud scales. Hatching occurs about mid May and new adults are formed by early June. New generations are produced every 2 to 3 weeks, thus populations may build up rapidly.

Control:

Hosing down trees or shrubs with a forceful spray of water about once a week will help to keep spider mite populations low, as they do not like wet conditions. Soapy water is even more effective. Severe infestations may require an application of insecticide such as diazinon or malathion. Read and follow label directions.

Mechanical Damage

Injuries to trees are often responsible for a decline in health and sometimes eventual death. Even minor soil disturbances can cause injury. Mature or very large trees seldom have sufficient regenerative capacity to survive major root damage, while younger trees are more likely to recover. It may take several years for an injured tree to die. Examples of damage include:

1. Injuries to roots or trunk by construction (eg. trenching for pipe or cable, street widening, building construction, putting in parking lots).
2. Damage caused by lawn mowers.
3. Soil compaction causing suffocation of roots. Water logging of soil due to poor soil drainage can also kill roots.
4. Changes in grade (raising or lowering level of soil over a tree's root zone can cause death).
5. Lightning damage

Transplant shock

Recently planted trees may fail to establish, particularly if roots were allowed to dry out before planting. The larger the tree, the less likely it will survive transplanting. A large tree which fails to become established after being moved may take up to several years to decline and die. Control: Buy tree stock from a reliable source. Do not allow roots to dry out before planting. Provide adequate supplies of water after planting.

Dog Damage

Animal urine damage will cause the outer foliage on the lower branches of ornamental shrubs to turn yellow, then brown to black and oily in appearance. Damage is more common during the winter months.

Control:

Commercial dog and cat repellents are available and may help to protect valuable shrubs from further damage. Fencing off access to the shrubs during the winter is another option.

Diseases

Diseases are sometimes responsible for browning of evergreens, but are actually quite rare in home garden situations.

1. A general decline of the whole tree could be caused by a root rot. There is no control.
2. Needle cast diseases may cause irregular yellowing, browning and shedding of needles, usually not in any specific pattern on a tree. Some fungicides are registered for needle cast diseases, however control is rarely necessary in urban plantings.
3. Cytospora canker may kill individual branches of spruce, usually from the bottom of the tree upwards. The cause is a canker on the main part of the branch, which may be slightly sunken or dripping with resin. Removing completely dead branches during winter may help to limit further spread of the disease. Usually only trees in a weakened condition suffer from Cytospora.
4. Pines may be killed by gall rust diseases (eg. Western Gall Rust). Trees transplanted from the northern Saskatchewan forest may bring this disease with them. Trees with gall cankers on the main stem should be removed. Branches with galls should be pruned out.

   If a plant disease is suspected, submit a sample to the Crop Protection Laboratory, Saskatchewan Agriculture and Food, for analysis.

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